A 3D virtual geology field trip in Unity

Conference or Workshop Item

A 3D Virtual Geology Field Trip in Unity

The Open University

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Being in Second Life

- enjoyable
- sense of presence, co-presence
- sense of engagement
- collaborative learning
- contextual learning

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Projects in Second Life

- socialisation
- team working in distributed teams
- design of 3D learning spaces
- navigation and wayfinding in 3D learning spaces

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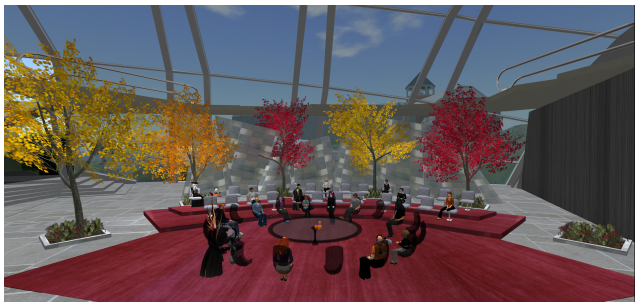
Institutional perspective



- software not owned by us
- control
- availability
- not perceived for education alone

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Funding came through but…

- 3D environments was perceived as being only for demo
- Successfully pursued that there should be a full working App
- Compared: Unity 3D, Open Sim, Second Life
- Chose virtual Geology trip as the candidate App

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3D Virtual Geology Fieldtrip

- will help demonstrate interactivity, sense of being there
- realism and high degree of fidelity
- visual and spatial experience not constrained by a ‘flat’ 2D user interface
- helps internalise the sense of exploration

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Background

- Real field trips two or three times a year (tutor-led)
- DVD to facilitate reflection and activities
- DVD also helpful for students who are unable to go for real field trips

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Lake District in the UK

- Skiddaw field area
- 6 sites (site 1 in Phase 1 of the project)
- Skiddaw group of rocks: sandstone, slates, granite
- how metamorphism varies in the Skiddaw group sedimentary rocks due to the intrusion of the Skiddaw granite
- how the Skiddaw Group rocks deformed during the mountain-building event

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Video Part 1 (what to look for?)

- Audio and textual guidance (tutor-led)
  - introduction
  - Geology of the area
  - instructions for learning activities
- Choice of avatars
- Choosing equipment for the field trip
- Task list
- Using the compass and sketching
- http://www.youtube.com/watch?v=5_h4Nl3AvCY

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3D Virtual Geology Field Trip App

- Realism
  - design of the environment or landscape
    - LIDaR data
    - Photogrammetry data
    - 3D modeling to weave it together
  - learning activities (similar to a real field trip)
    - choosing the equipment, sketching rocks

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Video Part 2 (what to look for?)

- student investigate grain composition of one rock
- overlaying maps on the landscape
  - ordnance survey map
  - Geology map
- cross-section of the mountains
  - showing the rocks (geology) underneath
- different views in each of the contexts
  - overhead, North-East, North-West, etc.

http://www.youtube.com/watch?v=MOdu5jQukUk

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3D Virtual Geology Field Trip App

- Non-realism (things you can't do in a real field trip)
  - microscopic views of rocks within the environment
  - draping maps on the landscape
  - cutaways into the mountainside to see the geology underneath

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Opportunities for students and educators

- practice/training for real life field trips
- reflect on your experiences of real field trips
- fly across the landscape
- additional field trip to real field trip
- replace a real field trip if resources are limited

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Limitations: students learning and experiences

- risk awareness skills
- challenges of being outdoors
- challenges posed by the weather
- challenges of using the equipment in real life
- bonding with other students

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Challenges of 3D virtual field trips

- costs involved
- multi-skilled team and specialist developers are required
- student training
- overcoming the (negative) perceptions that people have about virtual field trips
- how best to communicate that virtual field trips are not being proposed to replace real field trips

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Web links

- Daden: http://www.daden.co.uk
- The Open Science Laboratory:

http://www.open.ac.uk/researchprojects/open-science/

- Virtual Skiddaw 3D Geology Field Trip

https://learn5.open.ac.uk/course/format/sciencelab/section.php?name=skiddaw_1

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